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Contribution of Selected Universities of Assam in Scholarly Publications During the year 2011-2020: A Bibliometric Study

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ABSTRACT

Bibliometrics play an important role in research evaluation. Several attempts have been made to analyze the research performances in different areas using Bibliometrics method. However, no previous study attempts to explore the research performances of Assam Universities. Due to the lack of bibliometric studies on Assam Universities, the present study aimed to explore contribution of scholarly publications of selected universities of Assam during the time span of 2011-2020. A total of 11578 numbers of documents were published during the ten years study period. The data were extracted from the Scopus database to ferret out the publication productivity, research trend, authorship pattern, most prolific author and most preferred journal, the growth of publications and contribution of the universities etc. The study shows that journal articles were the most preferred form of publication. The study noted gradual growth of publication in every year. The prolific research area was science and technology, where physics and chemistry cover a large area. The most prolific author was Das S. and the most preferred journal was RSC Advances.

Keywords: Bibliometric, Scholarly Publication, Assam, University, Citation.

1. Introduction:

Scholarly publication is basically apprehended as the publishing of research result. In today's research environment, scholarly publication is one of the undeniable elements to enhance research profiles of academicians. Now-a-days research is an inevitable part of academic life. Research fosters creation of new knowledge and information in various subject domains, which pave a way to the growth of disciplines concerned. Research is one of the momentous parameter to define academic excellence of various institutions, especially college and universities, which considered as the beacon light that play a major role in the substantial growth of research globally. In India higher education system deals with teaching, research, innovation and training which in turn aim to foster academic excellence, develop scientific temperament and ecosystem, industrial innovation and entrepreneurship (Confederation of Indian Industry Higher Education, 2015). Assam which is located in Eastern part of India is enriched with a number of higher education institutions. These institutions are run by central government, state government and private institutions. There are two central Universities, 15 state universities; two deemed universities and 6 private universities (Wikipedia, 2021). According to NIRF ranking 2020, Tezpur University ranks at 65, Gauhati University at 72 and National Institute of Technology, Silchar at 94. However, three universities of Assam made it to the top 100 university rankings. Tezpur University has ranked in the top 50 Indian universities (Pratidin Bureau, 2020)(Pratidin Bureau, 2020). Because of the high growth of research institutes in India (Department of Higher Education, MHRD, Govt of India, 2016) it has become very essential to have regular assessment of research productivity of the higher academic institutions. It is necessary to analyze research productivity of academic institutions to find out strength and weakness of research products, for which Bibliometric is a

popular tool. So, the present study is undertaken to make an attempt to analyze the research productivity of some selected universities of Assam based on Bibliometric analysis using the secondary data from Scopus database. The current study intends to identify the characteristics and research output of some selected universities of Assam during the year 2011-2020.

2. Literature Review:

Literature review works as a handy guide to a particular topic and it helps us to have a comprehensive knowledge of the literature available in the field on which a study is being taken up. For this study a total no of 11 journal articles have been selected, identified and considered for review which covers various aspects of Bibliometric parameters, research output of universities, research areas etc.

(S. Das et al., 2020) undertook a bibliometric study to find out the research productivity of Mizoram University during 2002-2018. The study found 2016 and 2017 as the most productive years for this Universities with 18.43% and 14.33% Publications respectively. The study noted Thapa R. K. and Tiwari D. as the most prolific author and found Current Science as the most preferred journal for Publication.

(Deka, 2020) carried out a study to explore the research productivity of Dibrugarh University from 1989-2020 through the lens of Web of Science database. The study noted a steady growth in reserach Publication. According to this study 2019 is the most prolific department was chemistry.

(Parabhoi & Verma, 2020) conducted a scientrometrics analysis of Coronavirus research output during 2001-2020. The study found a total of 14439 documents in the Scopus database. The study found United States as the most prolific country with 9973 numbers of Publications followed by China. In terms of the numbers of publications contributed by individual institutes, the University of Hong Kong and the Chinese University of Hong Kong ranked first and second position globally. The study noted a considerable growth in Scholarly Publications related to corona virus in early 2020.

(Parabhoi et al., 2020) conducted a study on gender disparity among Indian LIS professionals assessed by first author of publications indexed in Scopus database during 1999-2018. The study reviewed 1195 number of publications published in the field of LIS from 1999-2018. The study found that, during the study period male author's outnumbered female authors in terms of first-authored Publications. Hence, overall contributions by men were higher than by women. The study found B.M. Gupta and M. Tripathy as the most prolific male and female authors respectively. The most common keyword used by both first author genders was 'India'. Articles by men outnumbered those by women on both international and national level. The study noted that female authors published a higher proportion of their papers in International Publications compared to male authors.

(Sahu & Parabhoi, 2020) conducted a bibliometric study on Library and Information Science journal articles during 2014 to 2018 to find out the LIS research trends. In this study they reviewed 1357 documents from 2014 to 2018 indexed in Scopus database and found that the preferred source for Publications was DESIDOC Journal of Library and Information Technology. Moreover, they found that Indian LIS professionals like to publish research papers collaboratively.

(Parabhoi & Sahu, 2019) undertook a study to examine research publications of Himachal Pradesh University during the year 1972 to 2015. The authors used Scopus database as a data source for the study.

The study revealed that the most preferred form of Publication is journal and they found that Publication trends in every year were upward hence they noted a steady growth in Publication and inter-university collaboration over the years.

(Parabhoi & Ghosh, 2019) conducted a comparative study on *Annals of Library and Information Studies* and *DESIDOC Journal of Library and Information Technology*, the two esteem LIS journals to examine the contribution of international authors in these two Indian journals. In this paper they found that international contribution to these two journals were unstable. The study noted that authors from Nigeria contributed highest number of articles i.e. 35 numbers to these two journals.

Another study made by (Parabhoi, 2019) on Scholarly Publications of Academic Librarians in India using Google Scholar data. The study found a total 683 Publications during 1989-2018. The study found that the growth of publications was unstable and half of the publications had no citations. The study also identified that the preferred form of publications of the authors are journal articles and conference papers.

(Kalita, 2017) carried out a study to trace the research productivity and its impact analysis of the central universities of North-east India during 2006-2015. The study found that during the study period the research productivity counted via Publication output have seen a CAGR of 23% and the same for research impact is 52%. The study found 'Chemistry' as the most productive research area followed by physics.

(Parabhoi et al., 2017) conducted a bibliometrics study to analyse the authorship pattern, collaboration pattern and highly cited paper etc. of Dr. Yashwant Singh Parmar University of Horticulture and Forestry, Solan, Nauni during the year 2006 to 2015. The study found that the most preferred form of publication was journal articles with 88.21% and also reveals that most research took place in the area of biological science and agriculture.

(Marisha et al., 2017) undertook a study on research performance of 39 central universities of India, where their stand-point was important indicators of authorship and collaboration pattern, citation impact and research productivity. The study unveiled that, out of 39 central universities, Delhi University performs the best, followed by Banaras Hindu University.

(Sa, Manoj Kumar; Parabhoi, 2017) conducted a study on research productivity on Facebook. This paper was mainly focused on to analyze the research productivity on Facebook during the year 2012 to 2015. During the period of study, a total number of 3054 papers were published, where United States contributed highest no. of papers i.e. 1024 than other country. This study found that social science was the main domain area of Facebook study.

(Goswami & Hazarika, 2016) carried out a scientometrics study to examine the research contribution of Assam University from 2000-2015. The study found a total of 714 numbers of bibliographic records during the study period, which has a total of 3172 citations. The average output of the University was 45 Publications per year.

(Radhakrishnan & Velmurugan, 2015) has carried out a study of Scholarly Publication of the faculty members of Periyar University, Salem, India. The study result showed that till 2004 the publication growth was very low but they noted a steady growth since 2005. They found 2014 as the most productive year with 148 papers.

(Gopikuttan & Aswathy, 2014) carried out a study based on data extracted from Web of Science database to find out publication productivity of Kerala University. The study examined the overall performance of the faculty of Kerala University in Scholarly Publications. The study found that the higher number of papers were produced by the subject chemistry. The study noted that the research productivity of Kerala University was able to get much appreciation and recognition at international level.

A bibliometrics study on authorship trends in Periodontal Literature was conducted by (Geminiani et al., 2013). The study reported a significant increase in the average number of authors per publications from 1995 to 2010. The study found a significant change in Periodontal Literature and also found that South Africa and Asia originating publications have been rapidly increasing in proportion.

(Baby K. & Kumaravel, 2012) analyzed the research productivity of Periyar university. The study found a steady growth in Publication from 1998 to 2010. The preferred source of publication of the Periyar University was journal articles.

3. Objective of the Study:

Following are the objectives of the present study:

1. To identify the type of publication of these universities.
2. To find out the year wise growth publication of the papers.
3. To trace the trend of research productivity of these universities.
4. Ranked the authors on the basis of author productivity.
5. To understand authorship pattern of publications.
6. To find out the top most preferred journal of the authors.
7. To find out the most cited papers during these years.
8. To analyze the most preferable area of research.

4. Area of the Study:

The present study deals with the scholarly publication of the universities of Assam. The study is confined to the five central and state universities of Assam, which are- Tezpur University, Assam University, Dibrugarh University, Gauhati University and Bodoland University.

5. Methodology:

Methodology is must to complete a research work. Initially, to address the research contribution of the universities of Assam, first compiled the comprehensive list of universities that are located in Assam from Google. 05 numbers of universities were selected for the study, which are run by central and state government. Scopus database used to collect bibliographical and citation data, Scopus is a popular indexing and abstracting database and widely used for bibliometrics and scientometrics study (J. M. Das & Parabhoi, 2020). Data for this study is extracted from the Scopus database on 23-02-2021 using 'affiliation search' filter. Data were analyzed using the bibliographical data visualization tools namely R-Programme (Bibliometrix package) and Microsoft excel.

6. Data Analysis:

6.1 Types of Scholarly Publication:

The table 1 portrays the types of scholarly publications published during the study period of 10 years i.e. 2011- 2020 in the Universities of Assam. Out of 11578 papers 78.17% (9050) were journal articles followed by conference papers with 12.30 % (1424) and the other document types like book chapters, reviews, editorial, book, article in press, data paper, erratum, letter, note, retracted and short survey were of 9.53% (686).

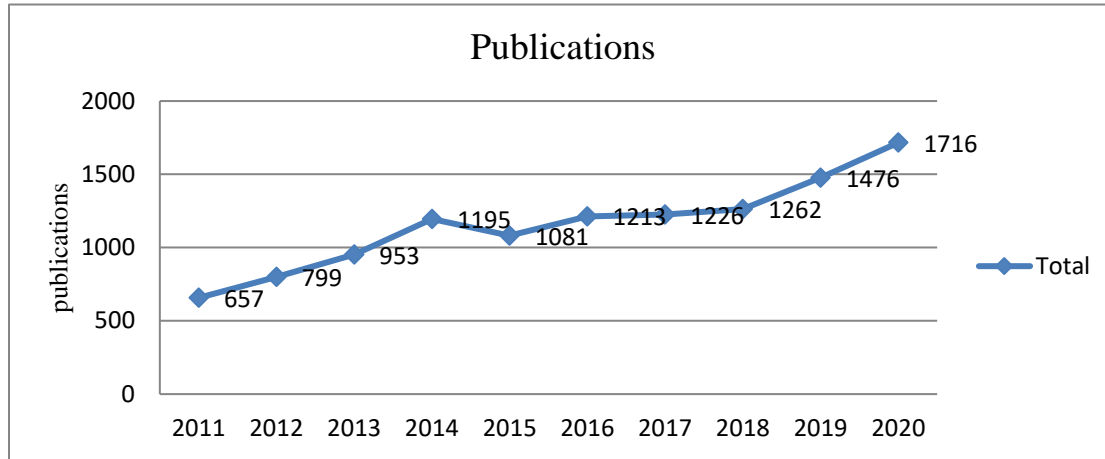
Table 1: Types of Research Publications

Types	Total No. of Published Documents	Percentage
Article	9050	78.17
Article in Press	2	0.02
Book	32	0.28
Book Chapter	453	3.91
Conference Paper	1424	12.30
Data Paper	1	0.01
Editorial	53	0.46
Erratum	38	0.39
Letter	56	0.40
Note	44	0.38
Retracted	1	0.01
Review	418	3.61
Short Survey	6	0.05
Total	11578	100

6.2 Year Wise Growth in Publication

The following figure presents chronologically, the number of publications published by the Universities of Assam during the year 2011-2020. The Assam universities contributed total of 11578 numbers of scholarly publications. There has been a stable growth in research publications of these universities during the study period except the year 2015, where a slight decrease in publication can be seen from the below figure. The highest number of documents i.e. 1716 numbers were published in the year 2020, followed by 2019 where 1476 papers were published.

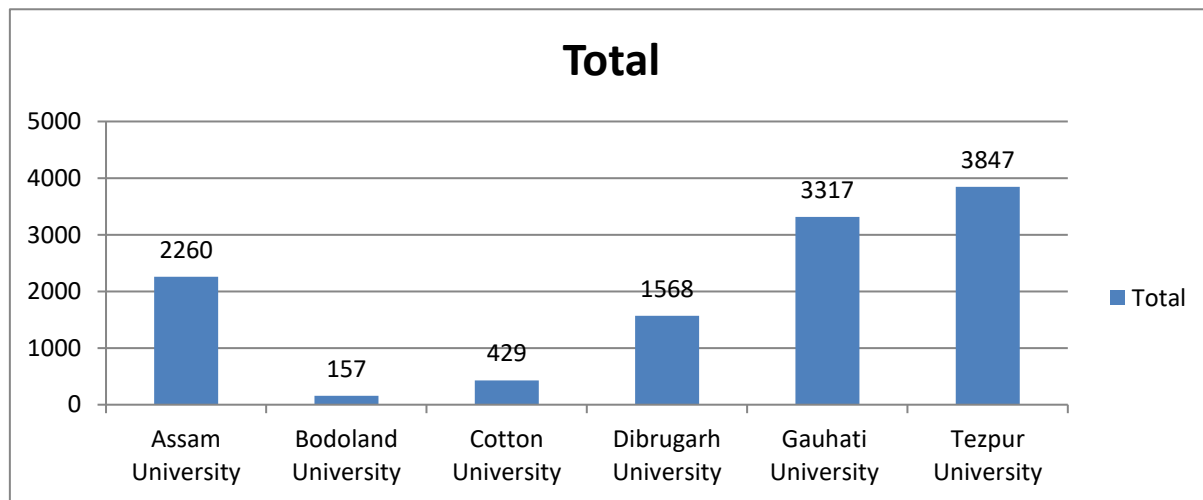
Figure 1: Year Wise Publications Growth



6.3 Contribution of Publications by Universities:

Figure 2 shows university wise contributions of papers, where it can be seen that Tezpur University contributed the highest number of papers i.e. 3847, followed by Gauhati University, which has contributed 3317 papers. Moreover, Cotton University has contributed 429 papers and Bodoland University has the least number of papers i.e. 157.

Figure 2: Contribution of Publication by Universities



6.4 Most Prolific Authors:

After analyzing the data of publication of the Universities of Assam during 2011-2020, the study found that total of 11578 number of publications were contributed by 13074 number of authors. The authors were ranked according to their number of scholarly publications. The author who published more number of papers is considered as the most prolific author. The study reveals S. Das as the most prolific author with 228 numbers of publications, followed by A. Kumar with 210 publications, Karak N. 185 number of publications and so on. On the observation of the table 2, it has been clearly shown that out of total publications during

the study period of ten years, the top 10 authors have contributed 14.52% out total publications. The study found Karak N. as the top author on the basis of Average Citation Per Paper (ACPP).

Table 2: Most Prolific Author

Sl No	Author	Documents	Citations	ACPP	Rank as per ACPP
1	Das S.	228	1556	6.82	8
2	Kumar A.	210	2290	10.90	4
3	Karak N.	185	4793	25.90	1
4	Chakraborty S.	179	1244	6.95	7
5	Roy S.	168	687	4.09	10
6	Ghosh S.K.	155	1589	10.25	5
7	Dutta H.	152	676	4.45	9
8	Bhattacharyya D.K.	136	2593	19.07	2
9	Das D.	134	1111	8.29	6
10	Deka R.C.	134	1734	12.94	3

6.5 Authorship Pattern:

Table 3 portrays the authorship pattern of publication of selected universities of Assam during the study period 2011-2020. The table indicates that instead of individual authorship, collaborative authorship was more popular and published more papers. The authorship data were classified into two classes' namely multi-authored and single-authored documents. The data shows that multi-authored papers contributed 93.77 % of the total publications, whereas single authored papers contributed only 6.23 %, which portrays that the research community preferred to publish their papers collaboratively.

Table 3: Authorship Pattern

Authorship Pattern	No. of Authors	No. of Documents	Percentage
Single- authored	394	721	6.23
Multi-authored	12680	10857	93.77
Total	13074	11578	100

6.6 Most Preferred Journals:

The following table shows the most preferred journals of the research community of the universities of Assam. It shows that the RSC Advances was the most preferred journal with 140 papers, followed by Current Science with 106 papers. It can be seen that the research community has published their papers in both Indian and International journals. The journals in the domain of science and technology and especially which deals with the subject of physics and chemistry were the most popular and most productive area of research.

Table 4: Most Preferred Journals by the Research Community of Assam Universities

S/N	Sources	Articles
1	RSC Advances	140
2	Current Science	106
3	International Journal Of Scientific And Technology Research	97
4	Advances In Intelligent Systems And Computing	96
5	Tetrahedron Letters	89
6	Physics Letters Section B: Nuclear Elementary Particle And High-Energy Physics	80
7	Chemistryselect	75
8	Aip Conference Proceedings	68
9	Journal Of Physics: Conference Series	67
10	Lecture Notes In Electrical Engineering	67
11	International Journal Of Pharmacy And Pharmaceutical Sciences	65
12	Indian Journal Of Physics	63
13	New Journal Of Chemistry	63
14	Asian Journal Of Chemistry	61
15	Lecture Notes In Computer Science (Including Subseries Lecture Notes In Artificial Intelligence And Lecture Notes In Bioinformatics)	61
16	Journal Of High Energy Physics	58
17	European Physical Journal C	52
18	Economic And Political Weekly	50
19	Journal Of Food Science And Technology	47
20	ACM International Conference Proceeding Series	45

6.7 Top Cited Papers:

In the following table top 10 cited papers were listed. The paper titled “Plant Growth Promoting Rhizobacteria (PGPR): Emergence in Agriculture” by Bhattacharyya P. N., Jha D. K. of Gauhati University, published in World Journal of Microbiology and Biotechnology is the most cited paper which was highly cited 893 times, followed by “Network Anomaly Detection: Methods, Systems and Tools” by Bhuyan M. H., Bhattacharya D. K., Kalita J. K. of Tezpur University, published in IEEE Communications Surveys and Tutorials with 601 citations and “Kinetics of Adsorption of Metal Ions on Inorganic Materials: A Review”

by Sen Gupta S., Bhattacharya K.G. of Gauhati University, published in Advances in Colloid and Interface Science, which has 501 number of citations and so on. Further, data informed that, highly cited papers were published by collaboratively.

Table 5: Top Cited Papers

SI No	University	Title	Authors	Year	Source title	Cited by
1	Gauhati University	Plant growth-promoting rhizobacteria (PGPR): Emergence in agriculture	Bhattacharyya P.N., Jha D.K.	2012	World Journal of Microbiology and Biotechnology	893
2	Tezpur University	Network anomaly detection: Methods, systems and tools	Bhuyan M.H., Bhattacharyya D.K., Kalita J.K.	2014	IEEE Communications Surveys and Tutorials	601
3	Gauhati University	Kinetics of adsorption of metal ions on inorganic materials: A review	Sen Gupta S., Bhattacharyya K.G.	2011	Advances in Colloid and Interface Science	501
4	Gauhati University	Long-range angular correlations on the near and away side in p-Pb collisions at $\sqrt{s_{NN}}=5.02$ TeV	Abelev B., eta,al..	2013	Physics Letters, Section B: Nuclear, Elementary Particle and High-Energy Physics	491
5	Tezpur University	A green and facile approach for the synthesis of water soluble fluorescent carbon dots from banana juice	De B., Karak N.	2013	RSC Advances	444
6	Gauhati University	Performance of the ALICE experiment at the CERN LHC	Abelev B., eta,al..	2014	International Journal of Modern Physics A	410
7	Tezpur University	Green reduction of graphene oxide by aqueous phytoextracts	Thakur S., Karak N.	2012	Carbon	348
8	Tezpur University	Routing and Spectrum Allocation in Elastic Optical Networks: A Tutorial	Chatterjee B.C., Sarma N., Oki E.	2015	IEEE Communications Surveys and Tutorials	347
9	Assam University	Reactive oxygen species signaling in plants under abiotic stress	Choudhury S., eta, al	2013	Plant Signaling and Behavior	311
10	Assam University	Excess copper induced oxidative stress and response of antioxidants in rice	Thounaojam T.C., eta,al..	2012	Plant Physiology and Biochemistry	239

6.8 Keyword Analysis:

Author's keywords analyzed using biblioshiny tool and package of R-programming. The following figure indicates the analysis of the most frequently used keywords during the year 2011-2020. The study found a total 25253 unique keywords used during the study period. The figure showed that Assam was the first and frequently used keyword, followed by India and antioxidant respectively. Closer inspection of figure shows that, the researchers of Assam Universities focused areas were sciences and their related branches which were related India and Assam.

Figure 3: Keyword Analysis



6.9 Current Trends:

The highest number of papers i.e. 1716 has been published in the year 2020 in the selected universities of Assam during the study period 2011 to 2020.

- Das S. is the most prolific author with 228 numbers of papers.
- The study also shows that multi-authors have been published highest number of articles i.e. 10, 857 numbers of documents during 2011-2020.
- During the study period (2011-2020) RSC Advances, Current Science, International Journal of Scientific and Technology Research are the “core journals” in the field of scholarly publications.
- The study also reveals that the most preferred area of research were physics and chemistry than humanities.

7. Conclusion:

This study analyzed contribution of the universities of Assam in scholarly publication during the year 2011-2020. This study noted a significant growth in research publications during 2011-2020. There were a total 11578 numbers of papers published by 13074 numbers of authors. The study found 2020 as the most productive year with 1716 number of publications and identified Das S. as the most prolific author with 228 numbers of papers. Furthermore, the data indicates that single authors published 721 (6.23 %) and multi-authors published 10857 (93.77%) papers during the study period. It proves that research community is interested in collaborative research work than independent work. Moreover, the study reveals that the most cited paper is “Plant Growth Promoting Rhizobacteria (PGPR): Emergence in Agriculture” by Bhattacharyya P. N. with 893 citations, followed by “Network Anomaly Detection: Methods, Systems and Tools” by Bhuyan M. H., Bhattacharya D. K., Kalita J.K. with 601 citations. It is also found that Tezpur University has contributed the highest number of papers i.e. 3847 and Bodoland University has contributed least number of papers i.e. 157. It is also revealed that majority of authors preferred to publish their articles in RSC Advances. Furthermore, keyword analysis revealed that words such as “Assam”, “India”, “Antioxidant” were mostly used in research publications. The study found that though the scholarly publications of the universities are gradually increasing, but it is not satisfactory yet to pace the ever-increasing publications of other universities. These universities need to work hard on enhancing the research profiles of their research community.

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